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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/932,532	08/17/2001	Alan Britt	33053	4288

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EXAMINER

COMPTON, ERIC B

ART UNIT	PAPER NUMBER
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3726

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/932,532

Applicant(s)

BRITT ET AL.

Examiner

Eric B. Compton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 17-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 25-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Claims 17-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 10.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 12-15 are rejected under 35 U.S.C. 102(b) as anticipated by a book entitled "Die Castings Their Design, Composition, Application Specification, Testing and Finishing" by Herbert Chase (hereinafter "Chase").

Regarding claim 12, Chase, on page 13 discloses, "Perhaps the largest aluminum die casting ever produced is a lower **crankcase** or oil pan for an automobile engine. It has both internal and external fins to facilitate heat transfer, and all holes are cast to finished size, the only machine work required being the tapping of some holes." (emphasis added). In Figure 9 (bottom) of the crankcase, the mounting flange is clearly shown having the cast opening on the mounting flange. Detailed casting plans for the crankcase are shown on pages 180-181. On page 136, Chase notes "**As surface layers are usually the densest as well as the strongest portions of the castings, it**

is desirable to disturb them as little as possible by grinding or other machining, especially as the layer of metal just below the surface often contains minute pores which, if uncovered, may show up when the surface is finished.” (emphasis added). Additional reference is designing die-casting such that grinding is minimizing since the surface quality of die-castings is of such high quality. Pages 226-227. On page 138, “A large proportion of die castings are given no other surface treatment than fin removal, but those which are to be enabled or lacquered are often sand blasted. This type of treatment is not always recommended, and should in any case be used with discretion, as excessive sand-blasting will remove the surface and is likely to uncover sub-surface pores.” Page 227. See also the teachings of the Prior Art, below, discussing essentially the same problem.

Regarding claims 13-15, Chase discloses the tolerances for aluminum are 0.002 inch; the footnote suggests ± 0.0015 in. per in. for commercial accuracy as well.

“[W]hen, as by a recitation of ranges or otherwise, a claim covers several compositions, the claim is ‘anticipated’ if one of them is in the prior art.” *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-11 and 25-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Chase.

AAPA, as found on pages 1-2 of the specification and Figures 6-10 disclose forming a cylinder heads and crankcases, by the conventional casting process. The primary distinction between the method of AAPA and Applicant's invention is that Applicant relies on a die-casting process with high tolerances. See section [0070]. Consequently, Die-casting with high tolerances alleviates the need to machine the mounting flange surface (step 3) and drill and tap the flange openings (steps 5 & 6). *Id.* Otherwise, the additional manufacturing steps of AAPA are essentially identical to Applicant's invention (e.g. tapping the spark-plug aperture). Compare Figure 10 to 11. The finished product produced by Applicant's invention is intended to have the same structure as that of AAPA having cylinder chamber, spark-plug aperture, exhaust port, and mounting flange. Compare Figures 1-5 to 6-9.

However, AAPA does not disclose die-casting with high tolerances such that additional machining of the mounting flange is not required.

Chase discloses the invention cited above. Specifically, Chase discloses the die-casting process in great detail. A number of examples are further disclosed, including a crankcase. On page 136, Chase notes "***As surface layers are usually the densest as well as the strongest portions of the castings, it is desirable to disturb them as little as possible by grinding or other machining, especially as the layer of metal just below the surface often contains minute pores which, if uncovered, may show up when the surface is finished.***" (emphasis added). Additional reference is

designing die-casting such that grinding is minimizing since the surface quality of die-castings is of such high quality. Pages 226-227. On page 138, "A large proportion of die castings are given no other surface treatment than fin removal, but those which are to be enabled or lacquered are often sand blasted. This type of treatment is not always recommended, and should in any case be used with discretion, as excessive sand-blasting will remove the surface and is likely to uncover sub-surface pores." Page 227.

Regarding claim 1 and 7, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed a cylinder head for a small engine of AAPA by die-casting without machining the mounting flange, in light of the teachings of Chase, in order to preserve the density of the of the surface layer and to minimize or eliminate finishing.

Regarding claim 25, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed a cylinder head and crankcase assembly of AAPA by die-casting without machining the mounting flange, in light of the teachings of Chase, in order to preserve the density of the of the surface layer and to minimize or eliminate altogether finishing.

Regarding claims 2, 3, 8, 9, 26, 27, Chase discloses, "Die castings usually have a surface so smooth as to require no grinding or polishing other than that required for fin removal ..." Page 227.

Regarding claims 10, 11, 31 and 32, Chase discloses, "Die castings usually have a surface so smooth as to require no grinding or polishing other than that required for fin removal ..." Page 227.

Regarding claims 4, 5, 6, 7, 28, 29, 30, 33, 34, and 35, Chase discloses the tolerances for aluminum are 0.002 inch; the footnote suggests ± 0.0015 in. per in. for commercial accuracy as well. Where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

6. Claims 16 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chase or AAPA/Chase, in view of JP 11-093770 to Osawa (SUZUKI).

Chase discloses the invention above; however does not disclose the die-casting a groove for an O-ring gasket-sealing member.

Osawa discloses an intake passage structure for an internal combustion engine. The cylinder head cover (3) is formed by a die-casting process to include recesses (3a) on the mounting surface for a sealing member (5). JPO English Abstract; see also Figure 6.

Regarding claims 16 and 36, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the crankcase of Chase or cylinder head and crankcase AAPA/Chase, having an O-ring groove, in light of the teachings of Osawa, in order to effectuate better sealing between the crankcase and engine.

Prior Art References

The prior art references listed on the enclosed PTO-892, but not used in a rejection of the claims, are cited for their teachings of die casting engine parts.

The prior art is abounding with teachings of the same problem that Applicant faced:

U.S. Pat. 5,025,760 to Webb et al disclose cylinder heads formed by a die casting process. See Col. 2, lines 52-58. In the prior art, it was disclosed that [M]achining is typically necessary to correct other defects." Col. 1, lines 28-29. Thus, to overcome the disadvantages in the prior art, a die-casting process is used. "There are several advantages to the die-casting process. All-metal mold, external-pressure castings have **close tolerances**, sharp outlines and contours, **fine smooth surfaces**, and a high rate of production accompanied by low labor costs. Fine section and excellent detail can be achieved, together with long mold life." Cols. 1-2, lines 65-2 (emphasis added).

A book entitled "Die-Casting A manual for the user, buyer, and designer" by Arthur Street (hereinafter "Street") discloses the die casting process in great detail. On page 117, regarding machining, Street discloses, "The dimensions of a die-casting should be arranged to be such that a minimum amount of machining is necessary. ***This is because the skin (particularly of a pressure die-casting) is much harder and finer grained than the interior, consequently it is to the user's advantage that as little as possible of this skin shall be removed by a machining operation.***" (emphasis added). On pages 21-22, Street discloses the surface dimensions for

essential details within ± 0.005 in. per inch and holes can be made to similar accuracy; and on page 117, discloses that pressure die casting is accurate to about ± 0.0015 in. per inch. Figure 19, on page 62, shows a carburetor body and cover having a mounting flange having cored holes formed therein formed by die casting.

A book entitled "Die Casting" by H. H. Doehler (hereinafter "Doehler"), discloses the die casting process in great detail. On page 196, Doehler shows a cylinder head for a small engine, having cooling fins, cylinder chamber, mounting brackets, and mounting flange, produced by a die-casting process. "Die castings can be produced commercially to closer dimensional tolerances than is possible with ... process, with a corresponding saving of machining time and materials." Page 220. On page 180, Doehler discloses the tolerances for die-casting are disclosed: minimum ± 0.0015 in; at least ± 0.003 for commercial uses, for aluminum. Applicant seeks to use aluminum as well. Specification, page 1, [0005]. On page 191, discloses forming bosses and projections "used primary as fastening points ... when a die casting is later fitted to mating parts..." *Id.* On page 226, Doehler discloses "By careful coordination and control of the casting variables, such as metal and die temperature, pressures, shot speeds, and lubrication, as well as grating and venting, die casting can be made sound and free from porosity." "Household gas-meters, automotive hydraulic transmission parts, and various type of valves are examples of such sound die castings which do not require any treatment to make them reliable and successful." *Id.* Other "castings cannot be relied upon to have the same leakage resistance ... due to a less compact metal structure." *Id.* Furthermore, Doehler discloses that cylinder heads, engine blocks and crankcases may be produced having

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an "as-cast" finish, (5th class mechanical). Pages 351, 353. Cored holes can be produced. Page 181-183 (Figure 4.16, center, shows cored mounting holes on surface flange).

A book entitled "Die Casting for Engineers" (hereinafter "Die Casting") discloses the die casting process in great detail. The book notes the use on die casting to form crankcases on page 60. On page 80, regarding machining, the book discloses

Die castings are invariably cast within quite close dimensional limits but some machining, in addition to flash removal, is commonly required, even though it may be only simple operations as punching, drilling, reaming or tapping holes. In general, however, only very light cuts are required and the work can nearly always be done on light machines and at high speeds. Machining makes it possible to bring dimensions within closer limits and it usually results in surfaces which are smoother than can be cast. On the other hand, ... there are advantages in doing as little machine work as will meet requirements. This is partly because many castings contain small sub-surface pores which are likely to be uncovered even by light cuts. Such pores result in noticeable surface blemishes, especially when the piece is plated.

On page 112, the dimensional accuracy of die-casting for aluminum is disclosed to be 0.0015 in. per inch. A carburetor body having a mounting flange having holes formed therein is shown on page 116 formed by die casting. Both crankcase and carburetors are under pressure and thus must have closely mating mounting surfaces to prevent leakage.

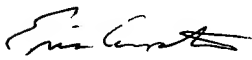
A guide entitled "Prototyping for Die Cast Components" notes "The exterior of a die cast section, to a depth of approximately 0.020 in. (0.5 mm), is dense and free of porosity, with somewhat mechanical properties."


Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Compton whose telephone number is (703) 305-0240. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter B. Vo can be reached on (703) 308-1789. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9302.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.


Eric Compton
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AU 3726


DAVID P. BRYANT
PRIMARY EXAMINER